

Gene editing approach aims for broad disease resistance in staple food crops

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Dr. Junqi Song, Texas A&M AgriLife Research plant pathologist in Dallas, believes his team has discovered a system for achieving broad disease resistance in a number of staple food crops. Credit: Texas A&M AgriLife photo by Gabe Saldana

A novel gene editing approach could hold the key to broad-spectrum disease resistance in certain staple food crops without causing physical detriment to the plants, said a Texas A&M AgriLife Research scientist.

Dr. Junqi Song, AgriLife Research plant pathologist in Dallas, explores



how a "knock-in" gene editing <u>approach</u> might achieve better <u>disease</u> resistance in a wide range of crop <u>plants</u>.

His team places special focus on addressing late blight disease in tomato and potato. The Texas grown crops are part of a nearly \$6 billion national production value, according to U.S. Department of Agriculture data.

"Most successes with broad-spectrum disease resistance so far have resulted from knockout gene editing, where certain genes are switched off to cause desired behaviors in a subject plant," Song said. "But successes from knockout editing come at a cost to many other aspects of the plant's physical health and other characteristics."

As an alternative to switching genes off, Song's team, using an emerging technology known as the CRISPR/Cas9 system, will introduce, or knock in, a specific set of genetic regulators. He believes the regulators discovered by his team will allow disease resistance to increase without harming the subject plant.

"By comparison, the knock-in approach is a much more complicated process than knockout," Song said.

The introduced systems would work by helping the plant's existing disease resistance <u>genes</u> to express more hardily against attacking pathogens. The wide range of pathogens targeted by Song's broad-<u>resistance</u> approach include phytophthora infestans, which causes late blight, a devastating disease in tomato and potato, he said.

He added any discoveries made through his research would carry <u>disease</u><u>resistance</u> implications for a number of food crops including wheat, rice, cotton, strawberry, carrot and citrus.



"There is a growing demand for agricultural production as global populations continue to grow," he said. "We will need to develop increasingly efficient systems to meet this demand and hopefully our work is a step in the right direction."

Provided by Texas A&M University

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